UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,552	12/18/2000	Andre Kempe	D/A0052	1511

7590   10/06/2004

OLIFF & BERRIDGE
P O BOX 19928
ALEXANDRIA, VA 22320

EXAMINER
SHORTLEDGE, THOMAS E

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *1-15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 December 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)	4)☐ Interview Summary (PTO-413)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____.
3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)	5)☐ Notice of Informal Patent Application (PTO-152)
Paper No(s)/Mail Date *04/02/2001*.	6)☐ Other: _____.

DETAILED ACTION

Drawings

1.   Figures 1-12 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: All of Figures 17,18, 21, 23, 24, 44, 49, 51, 65, 69, 70,71 and Fig. 19, elements 1118,1120,1122,1124,1126,1128,1130, Fig. 36, 2000,2001,2002,2005,2004, Fig. 43, 2202,2203,2206,2209,2210,2208,2211, Fig. 47, elements 2604,2605,2608,2609,2611,2612, Fig. 54, elements 3300,3306, Fig. 56, elements, 3500,3502,3501,3504,3503, and Fig. 59, elements, 3728,3730,3732,3734,3736,3738. Correct drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37

CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the

application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1 and 5-15 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kempe (WO 99/01828), in view of Naik (Efficient Computation of Unique

Input/Output Sequences in Finite-State Machines) and in further view of Monteiro et al.

(Finite State Machine Decomposition For Low Power).

As to claims 1 and 11, Kempe teaches:

factoring an ambiguous finite-state transducer (FST) into an ambiguous FST and

a fail-safe FST (splitting the classes into a subset of unambiguous classes and a set of

ambiguous classes (page 8, lines 29-31), which each are then later used to create

finite-state transducers, page 9, lines 4-6);

preprocessing the ambiguous FST to create a fully-unfolded (minimal) FST

having a plurality of state and arcs, with each arc having at least one input symbol and

at least one output symbol (disambiguating class sequences to create a FST, which, when disambiguated, would necessarily be a minimal FST. The arcs within the disambiguated FST would necessarily have at least one input and output symbol, page 9, lines 10-12, and 27-30);

grouping the plurality of arcs of the fully-unfolded FST into ambiguity fields (set of classes is split into a subset of ambiguous classes, page 8, lines 30-31);

arc outside of any ambiguity field, and an unambiguous and fail-safe FST (Fig. 2, arc from init to c3:t31 is outside the ambiguity field because the route can also be traveled by going, init to c1:t12 to c3:t31, init to c2:t23 to c3:t31, and init to c1:t12 to c2:t23 to c3:t31, the unambiguous and fail-safe FST are rejected in the preamble above)

arc inside the ambiguity field, and an unambiguous and fail-safe FST (Fig. 2, arc from init to c1:t12 to c3:t31, init to c2:t23 to c3:t31, and init to c1:t12 to c2:t23 to c3:t31 is inside the ambiguity field because the route can also be traveled so many different ways, the unambiguous and fail-safe FST are rejected in the preamble above).

Kempe does not teach:

copying the arc to the unambiguous FST, and copying to the fail-safe FST while replacing the corresponding input symbol with the corresponding output symbol;

copying the arc to the unambiguous FST while replacing the corresponding output symbol with a diacritic, and copying the arc to the fail-safe FST while replacing the corresponding input symbol with diacritic.

However, Naik teaches:

copying the arc to the FST, and copying to another FST while replacing the

corresponding input symbol with the corresponding output symbol (Fig. 3, Machine G2

and its projections, projections G2(1/1), and G2(0/0), projection G2(1/1) contains the

arcs within the ambiguity field, and G2(0/0) contains the arcs from the arcs outside the

ambiguity field);

copying the arc to the FST while replacing the corresponding output symbol, and

copying the arc another FST (Fig. 3, Machine G2 and its projections, projections

G2(1/1), and G2(0/0), projection G2(1/1) contains the arcs within the ambiguity field,

and G2(0/0) contains the arcs from the arcs outside the ambiguity field).

Therefore it would have been obvious to one of ordinary skill in the art at the time

of the invention to combine the process of preprocessing the ambiguous FST of Kempe

with the arc copying technique of Naik to increase the FSM usefulness in modeling the

control portion of data communication protocols, as taught by Naik (page 585, col. 1).

Kempe and Naik do not teach replacing the corresponding output symbol with a

diacritic.

However, Monteiro teaches of a transition marked with X, between states D and

B, this transition corresponds a new intermediate transition within each of the sub

machines, (page 760, col. 2).

Therefore it would have been obvious to one of ordinary skill in the art at the time

of the invention to combine the process of preprocessing the ambiguous FST of Kempe

with the arc copying technique of Naik, and with the symbol substation of Monteiro to

decrease the power consumption of the system, as taught by Monteiro (page 758, col. 1).

As to claim 5, Kempe teaches wherein grouping the plurality of arcs into ambiguity fields further comprises grouping the plurality of arcs into disjoint maximal sets of alternative arcs (mapping every sequence of ambiguity classes into a unique sequence of tags, these ambiguity classes and tags are represented by arcs within the a FST, therefore, when the classes are mapped into a unique sequence of tags, each sequence would represent an alternative arc within the FST, page 3, lines 37-39).

As to claim 6, Kempe teaches that arcs grouped together must have;

identical input symbols (matching pairs of identical class and tags are labeled with same pair, page 4, lines 23-25);

identical sets of input prefixes (combined sets of tags and sets that have identical properties are labeled with the same pair (page 4, lines 23-27); since these pairs are identical and unique they would have the same input prefixes);

identical sets of input suffixes (combined sets of tags and sets that have identical properties are labeled with the same pair (page 4, lines 23-27); since these pairs are identical and unique they would have the same input suffixes).

As to claims 7 and 12, Kempe teaches wherein the unambiguous FST and the fail-safe FST are adapted for performing language processing (deriving a FST from a HMM which is used as for tagging a relation between two languages, page 3, 34-36).

As to claims 8 and 14, Kempe teaches the language processing comprises tokenization, disambiguation, and spelling correction, (the FST are made from HMM, the HMM is able to disambiguate, and use tags (page 3, lines 34-37). The tagging process can be used within the processes of tokenization and spelling correction).

As to claims 9 and 15, Kempe teaches the input prefix and input suffix sets of the states of the fully-unfolded FST are one of identical and disjoint (the sets of input suffixes and prefixes come from states that have been derived by aligning matching and unique tags and classes to form pairs, page 4, lines 23-27, within these pairs the input prefixes and suffixes would necessarily be identical and disjoint).

As to claims 10 and 14, Kempe teaches the unambiguous FST and the fail-safe FST are lexical transducers (transducer can be used to represent a lexicon, page 3, lines 35-36).

5.   Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kempe in view of Naik in view of Monteiro et al. and in further view of Roche (Factorization of Finite-State Transducers)

As to claim 2, Kempe, Naik, and Monteiro do not teach factoring the unambiguous FST into a left-sequential and a right-sequential FST.

However, Roche teaches factoring the input FST into a left and right sequential FST (page 1, paragraph 2).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the process of preprocessing the ambiguous FST of Kempe with the arc copying technique of Naik, with the symbol substation of Monteiro and with the factorization process of Roche to increase efficiency and to lessen the need for large scale dictionaries as taught by Roche, (page 2, paragraph 2).

As to claim 3, Kempe, Naik, and Monteiro do not teach:

concatenating at least one boundary symbol to the ambiguous FST;

minimizing ambiguous FST to create a minimal FST with an input side and an output side;

left-unfolding the minimal FST to create a left-unfolded FST; and

right-unfolding the left-unfolded FST to create a fully-unfolded FST.

However, Roche teaches:

concatenating at least one boundary symbol to the ambiguous FST (Fig. 1, $ is introduced to the Transducer);

minimizing ambiguous FST to create a minimal FST with an input side and an output side (after factorization tn is the minimal sequential transducer, Tn having an

input and output so tn also has these, page 1, 4th paragraph though page 2, 1st

paragraph, and figure 1) ;

left-unfolding the minimal FST to create a left-unfolded FST (Fig. 3, right, Tleft);

and

right-unfolding the left-unfolded FST to create a fully-unfolded FST (Fig. 3, left,

Tright, and Fig. 5, Full Determination of A).

Therefore it would have been obvious to one of ordinary skill in the art at the time

of the invention to combine the process of preprocessing the ambiguous FST of Kempe

with the arc copying technique of Naik, with the symbol substation of Monteiro and with

the factorization process of Roche to increase efficiency and to lessen the need for

large scale dictionaries as taught by Roche, (page 2, paragraph 2).

As to claim 4, Kempe, Naik, and Monteiro do not teach:

determining a left-deterministic input finite state automation by extracting the

input side from the minimal FST and determinizing it from left to right;

assigning each state of a the left-deterministic input finite state automation that

corresponds to s set of state of the minimal FST a set of numbers; and

copying every state in the minimal FST to the left-unfolded FST as many times

as it occurs in different state sets of the left-deterministic input finite state automation.

However, Roche teaches:

determining a left-deterministic input finite state automation by extracting the

input side from the minimal FST and determinizing it from left to right (determinizing the

Automation A, by looking for input pairs that can be accessed by the same input, this is

done by looking at the pairs from a left to right manner as the states of the transducer

are traveled (page 6, paragraph 1 and 2);

assigning each state of a the left-deterministic input finite state automation that

corresponds to a set of state of the minimal FST a set of numbers (finding pairs of

states that can be accessed by the same input string, these pairs are then labeled by

numbers within the determinization of A, page 6, paragraph 1, and Figure 5);

copying every state in the minimal FST to the left-unfolded FST as many times

as it occurs in different state sets of the left-deterministic input finite state automation

(copying states from the FST, minimizing the FST by combining input symbols that

behave the same way, and then each of the input symbols that are left are replaced by

the equivalence class, and set to the left deterministic, page 7, paragraph 2 to page 8,

paragraph 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time

of the invention to combine the process of preprocessing the ambiguous FST of Kempe

with the arc copying technique of Naik, with the symbol substation of Monteiro and with

the state copying process of Roche to increase efficiency and to lessen the need for

large scale dictionaries as taught by Roche, (page 2, paragraph 2).

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kukula et al. (Finite State Machine Decomposition By Transition Pairing), and Chung et al. (6,278,973).

Kukula et al. teach finding submachines by encoding State Transition Graphs from the FSM.

Chung et al. teach a language processing method that uses a finite-state model containing a cascaded combination.

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas E Shortledge whose telephone number is (703)605-1199. The examiner can normally be reached on M-F 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Smits can be reached on (703)-306-3011. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

TS
9/28/04

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER